



GLAST Monthly PSR-January 2004

System Engineering

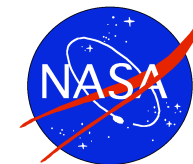
J. Leibee



RFA Status

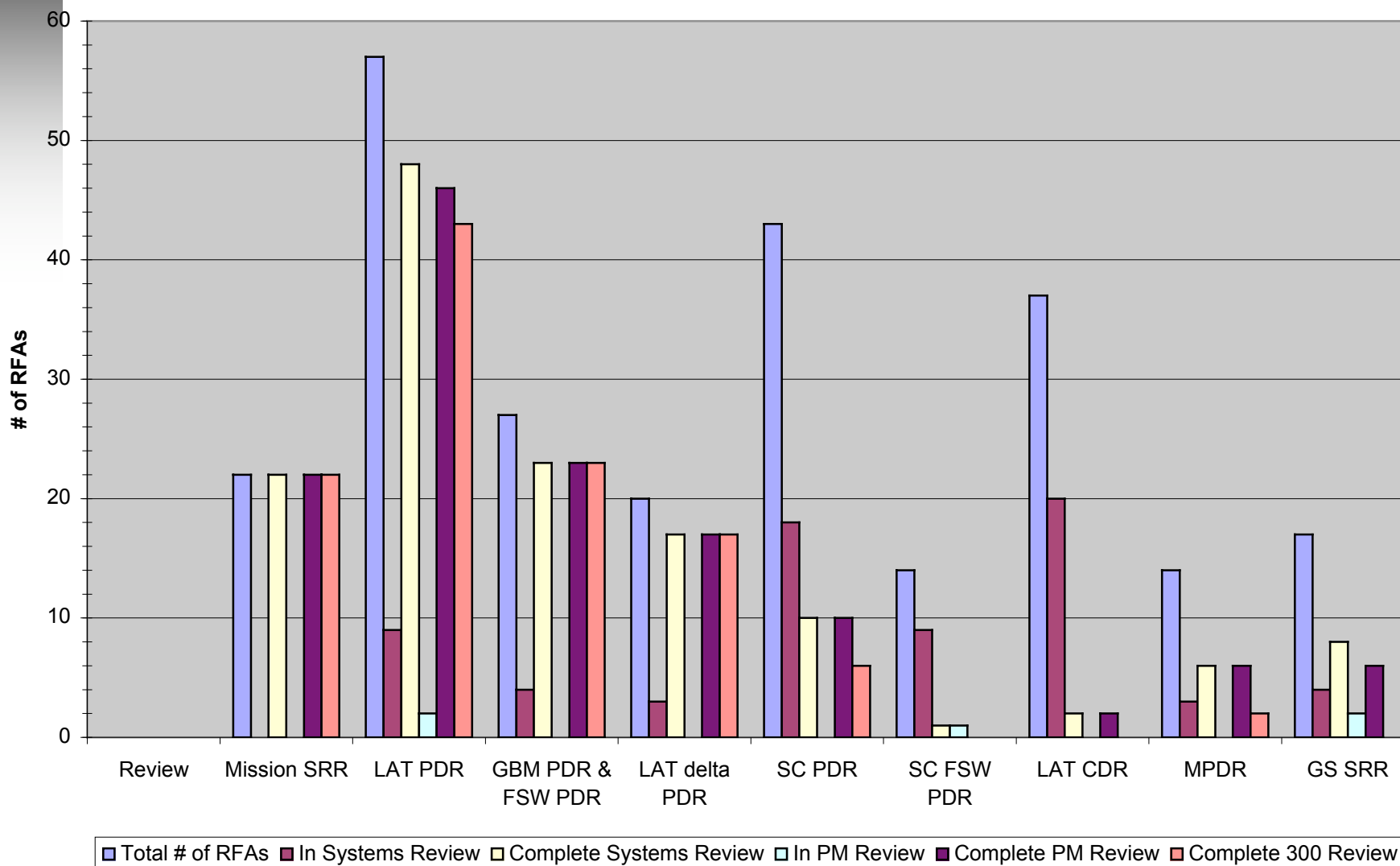
- Received PM approval for 12 of the 13 original responses sent. The 1 rejected response was regarding the GBM schedule.
- Received approval from the Originators for 8 of the responses & comments for 1 of the responses.
- Received PM approval for 14 of the 19 responses sent in December. Expect to close all comments within a week and send all 19 to the Originators.
- Received 13 new RFA responses and 1 updated response from SAI on 1/5/04.
- Working with Bernie & SLAC to update some of the LAT responses.
- Meeting scheduled for 1/16 with Systems & Subsystems engineers to review ~25 responses prior to sending on for PM review.

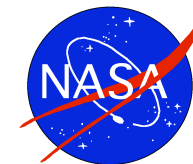
Review	Total # of RFAs	Systems Review Status		Project Review Status		Code 300 Status # Closed	Notes
		In Review	Complete	In Review	Complete		
Mission SRR	22		22		22	22	All Closed
LAT PDR	57	9	48	2	46	43	All Closed
GBM PDR & FSW PDR	27	4	23		23	23	4 Open, 1 Withdrawn
LAT delta PDR	20	3	17		17	17	3 Open
SC PDR	43	18	10		10	6	6 Closed by Originator
SC FSW PDR	14	9	1	1			All Open
LAT CDR	37	20	2		2		All Open
MPDR	14	3	6		6	2	2 Closed by Originator
GS SRR	17	4	8	2	6		All Open
Totals	251	70	137	5	132	113	



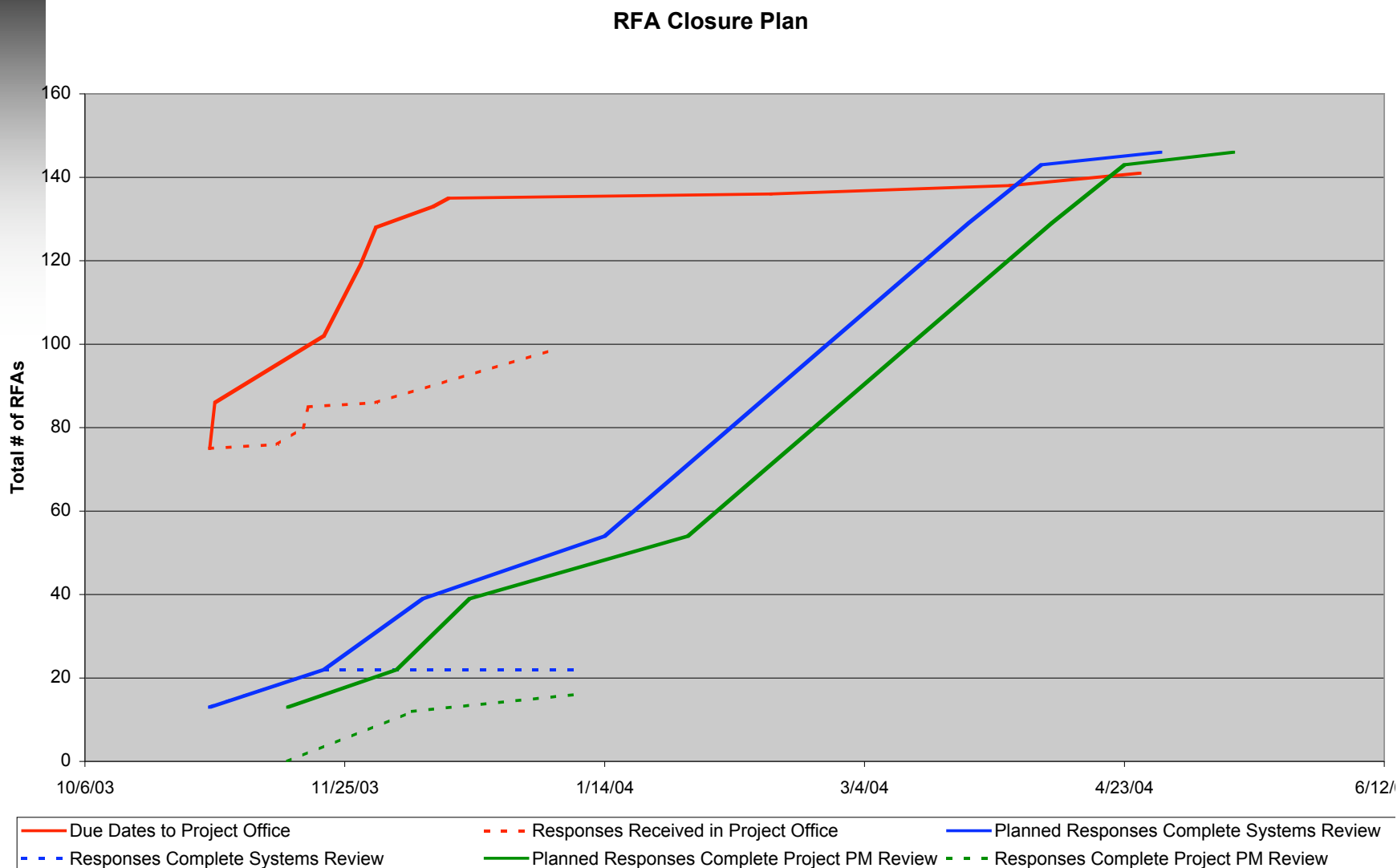
RFA Response Summary Chart

RFA Status by Review





RFA Closure Plan vs. Actuals





GLAST Project CCR Status

► **1 CCB held in December**

- *11 CCRs reviewed at the CCB, 10 approved and 1 deferred*
- *Deferred the Increased Power Capability for LAT pending resolution of PRU reliability analysis*
- *1 additional CCR approved out of board*

► **Currently there are 13 CCRs in the System**

- *Next CCB scheduled for 1/23*
- *Plan to board Increase in LAT data volume, LAT-GBM ICD, Project ITAR document, changes to SC CDRL 1, and digital images*
- *SSMAP and Risk Management Plan updates, if available*
- *Change in Launch Date and Instrument Slips are still in System*
- *Other CCRs in system include the 8 kbps performance, LAT CG and MOI, LAT radiator backload TBR, and Orbital Debris Report*



Accomplishments

- ▶ **ISMP requirements “finalized”**
 - *Assess impacts at Mid-term briefing to determine if revisions are necessary due to cost/schedule/technical concerns*
- ▶ **Burst Alert Latency estimates being refined**
 - *Current estimate is ~7-9 seconds*
 - *Project scientists : “No heroic measures on spacecraft should be taken to meet requirement”*
 - *Requirement(s) will be revised*
- ▶ **GLAST Orbital Debris Assessment Report still on hold**
- ▶ **Current monitoring and Launch configuration recommendations briefed to management**
 - *Solicit proposals from SAI for responses to specific Project direction*
 - *(e.g. Provide current sensors for critical hardware for SC subsystems [i.e. C&DH, RWAs, SAs, SSR, Transmitters])*
 - *(e.g. Transmit telemetry during entire launch sequence)*



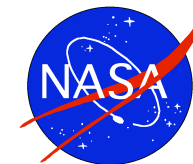
Observatory STOP Analysis Status



- ▶ **Cycle 2: Unit Thermal Gradient Analysis w/ interim LAT CDR models and Static Thermal Case Analysis**
 - *SAI to perform unit thermal gradient analysis using updated models*
 - 12/22 – Integration of finite-element models and model checkout complete
 - 01/26 – Perform unit thermal gradient analysis (compare to Cycle 1 results) and status results
 - *SAI to perform static case runs using integrated observatory models*
 - 12/19 – GPO-Thermal/Swales refined mapping and provided four static load cases to SAI
 - 01/21 – SAI to complete four static case runs
 - 01/26 – Spectrum to provide status on static thermal case analysis
- ▶ **Cycle 3: Observatory-Level STOP Analysis using final LAT CDR models**
 - *Transient case analysis using worst-case on-orbit thermal cases identified (and Cycle 1&2 results)*
 - 01/16 – SLAC to deliver LAT CDR FEM (10.07S) to GPO
 - *GPO pursuing in-house analysis capability (GPO-Mechanical & Swales) via special study*
 - *SAI able to perform Cycle 3 analysis post-peer review timeframe (end of March 2004)*
- ▶ **Cycle 4: Repperform Cycle 3 using T/V-correlated LAT models**
- ▶ **Cycle 5: Repperform Cycle 3 using T/V-correlated observatory models**



Mass Budget



		<i>Mass (kg)</i>				
		<i>Allocation</i>	<i>Estimate</i>	<i>Margin</i>	<i>%</i>	<i>Delta</i>
▶	<i>Dry SC</i>	1169	912	257	28	0
▶	<i>SC including propellant</i>	1530	1273	258	20	0
▶	<i>LAT</i>	3000	2756	244	9	0
▶	<i>GBM</i>	<u>97</u>	<u>84</u>	<u>13</u>	<u>15</u>	*
▶	<i>Observatory mass</i>	4627	4113	515	13	0

* GBM mass estimate undergoing revision based on subsystem CDR presentation.
 Rough estimate is 18 kg above total allocation including margin.

Delta II Heavy throw weight to 575 km with cg at 1.37 m = 4627 kg

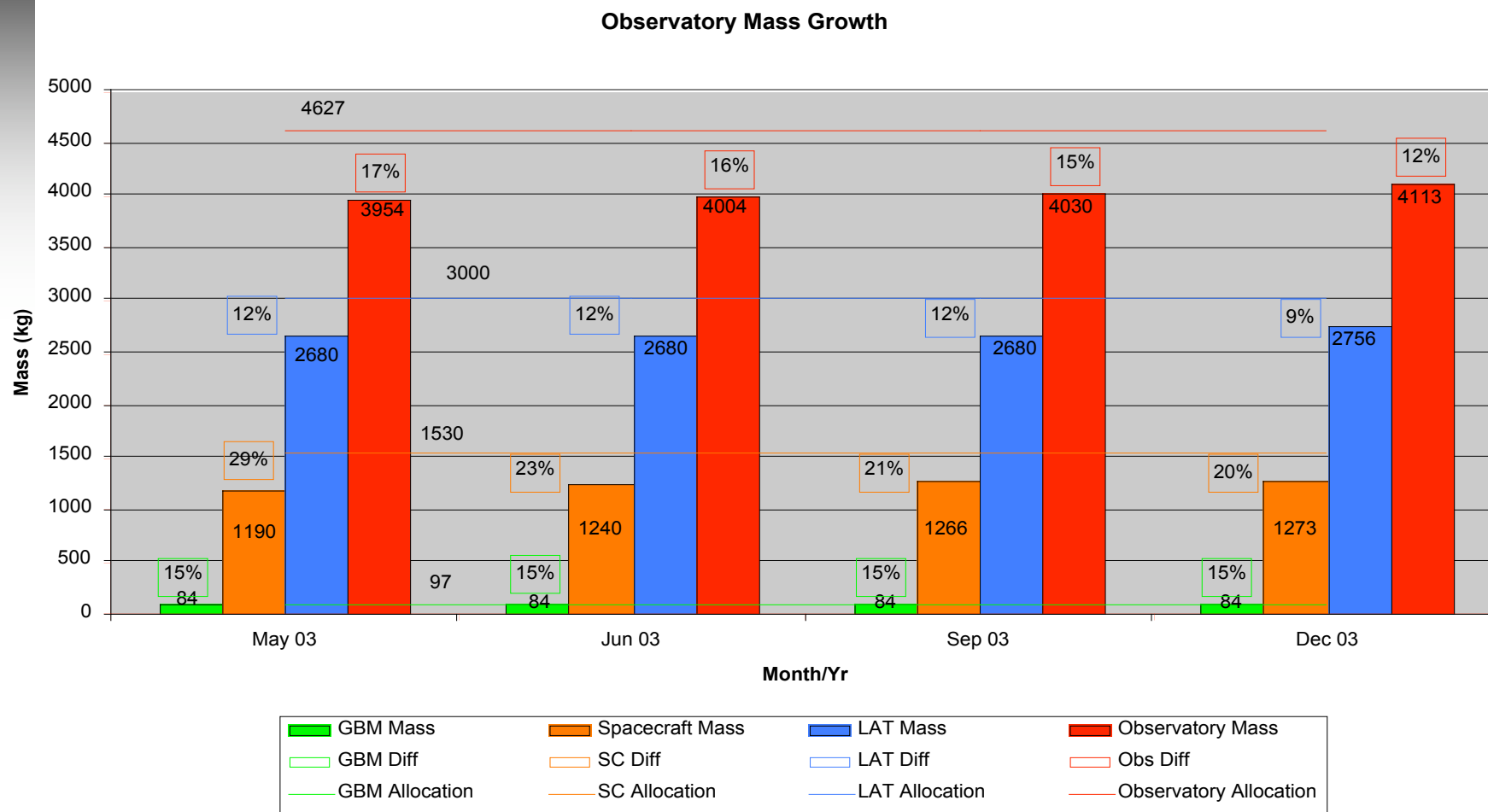
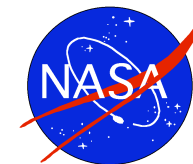
70% of LAT mass estimate is measured

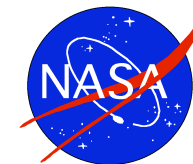
LAT is carrying 30% margin on the unmeasured LAT mass of 816 kg

01-08-2004



Observatory Mass Growth





Power Budget

	Orbit Average Power (Watts)				
	Allocation	Estimate	Margin	%	Delta
Spacecraft	985	734	251	34	0
LAT	650	566	84	14.8	-7*
GBM	<u>65</u>	<u>55</u>	<u>10</u>	<u>18</u>	<u>0</u>
Observatory total	1700	1355	345	25	-7

LAT Orbit average survival power: 278 W

Regulated VCHP power 58 W + Unregulated Passive Survival Power 220 W

Estimates do not reflect transition into or out of survival mode, only steady state orbit average.

* LAT science mode power estimate includes updates from the power supply peer review and measurements in power supply efficiencies.

72% of LAT science mode power (406 W) is categorized as measured.

LAT is carrying 52% margin on unmeasured power of 160 W.

01-08-2004



Top Issues/Concerns

- ▶ ***LAT data rate increase CCR needs quick go-ahead for Spectrum to purchase additional 64 M of memory for SSR***
 - *Allows 21/27 hours of science data storage at LAT 1.2 Mbps avg rate*
 - *Approval would help wrt SSR CDR in January*
 - *No CO direction to SAI to purchase additional yet*
 - *CCR in CM*
- ▶ ***Readiness for Spacecraft Peer Reviews***
 - *Departure of Jordan Evans*
 - *Outstanding CCRs/Study tasks (e.g. LAT Flexure change)*
 - *ISMP impact*
- ▶ ***GPS Antenna reliability does not meet 10 year goal***
 - *Swales to perform independent analysis of reliability*
- ▶ ***PRU max voltage (due to fault) of ~40-42 volts exceeds LAT threshold (damage to converters)***
 - *Awaiting definitive statement from SLAC on impacts*
 - *Design impact to PRU*



Top Issues/Concerns

- ▶ ***PRU reliability at high temperatures uncertain***
 - *Recent analysis indicates increased reliability may meet system requirements but still low for EPS*



Near-Term Schedule



- | | |
|---------------------------------------|--|
| – ISMP Mid-term Report | January 9 th 1:00 pm – 5:00 pm |
| – SSR CDR (SEAKR) | January 22 nd |
| – SIRU CDR (NGST) | January 22 nd |
| – SE Splinter (SAI) | January 26 th 1:00 pm – 5:00 pm |
| – Spectrum Monthly | January 27 th |
| – LAT Monthly | January 28 th |
| – Prop CDR (ARC) Peer Review | February 3 rd |
| – Spacecraft Systems/I&T Peer Reviews | February 18 th , 19 th |
| – EPS/RF COMM Peer Reviews | February 24 th , 25 th |
| – Spectrum Monthly | February 23 rd or 27 th |
| – LAT Monthly | February 25 th |
| – Thermal Peer Review | February 26 th |
| – Structures/Mechanism Peer Reviews | March 1 st , 2 nd |
| – C&DH/GNC/FSW Peer Reviews | March 3 rd , 4 th , 5 th |
| – Fault Protection Peer Review | March 8 th |
| – SC CDR Dry Run | March 29 th , 30 th , 31 st , April 1 st , 2 nd |
| – Lehman Review (LAT) | March 30 th , March 31 st , April 1 st |
| – SC CDR | April 26 th , 27 th , 28 th , 29 th |